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# BIOTECHNOLOGY

## Information on Prices of Genetically Modified Seeds in the United States and Argentina

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Mr. Chairman and Members of the Committee:

We are pleased to be here today to discuss the prices of genetically modified seeds—specifically, Roundup Ready soybean and *Bacillus thuringiensis* (Bt) corn seeds—in the United States and Argentina and the major reasons for any identified price differences between the two countries. Our statement today is based on our January 2000 report, which discussed these issues in detail.<sup>1</sup> In that report, we note that biotechnology is changing the face of agriculture. Needless to say, these changes are ongoing and will continue for years to come. I say this to put into context the data in our report and summarized here today. These data reflect past conditions—conditions that are dynamic and may well change from year to year.

In summary:

- The ranges of commercial prices in 1998 for popular varieties of Roundup Ready soybean seeds were higher in the United States than in Argentina.<sup>2</sup> At the same time, we found no clear price differences for Bt corn seeds.
- We identified two primary reasons for the price differences in Roundup Ready soybean seeds. First, there is greater control over patented seed technology in the United States. Roundup Ready soybean seeds are patented in the United States, but not in Argentina. Among other things, patents give a company more control in setting prices and restricting a product's use. For example, farmers in the United States are required to pay technology fees for using Roundup Ready soybean seeds and are not allowed to save and replant the seeds;<sup>3</sup> this is not the case in Argentina. Second, a strong black market<sup>4</sup> for seeds in Argentina has also contributed to lower prices in that country: An estimated 25 to 50 percent of the soybean seeds grown in Argentina are sold in violation of Argentina's seed law. The law was designed, among other things, to protect the plant breeders' intellectual property rights by requiring that all seeds be certified prior to sale.

In addition to the two primary reasons we identified for seed price differences, other factors relating to farmers' willingness to pay for seeds and seed companies' marketing strategies and production costs contribute to price variations.

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<sup>1</sup> Biotechnology: Information on Prices of Genetically Modified Seeds in the United States and Argentina (GAO/RCED/NSIAD-00-55, Jan. 21, 2000).

<sup>2</sup> In obtaining price ranges, we focused on prices paid by farmers in Argentina and in Illinois and Iowa—the two states with the largest soybean and corn acreage in the United States. In addition, the price ranges include technology fees (fees paid by farmers and others for the use of patented Roundup Ready soybean and Bt corn seeds), but do not include taxes. (Argentine farmers pay taxes on commercial seed; farmers in Illinois and Iowa do not.)

<sup>3</sup> Saved seeds are typically grain saved from a crop, reconditioned, and planted for the next year's crop.

<sup>4</sup> The term "black market" refers to trade in goods or commodities in violation of laws and regulations. As used in our report (and in this statement), it refers to the sale of soybean seeds in violation of Argentina's seed law (Act No. 20247; 1973). In addition, taxes are not collected on these sales, nor are royalties paid to the seed companies.

## Background

While genetically modified seeds are available for many crops, Roundup Ready soybeans and Bt corn are the ones most widely grown. Roundup Ready soybeans contain a gene that enables soybeans to withstand applications of Roundup—an herbicide effective on many kinds of weeds. Bt corn is genetically modified with a gene from a soil bacterium that makes the corn resistant to certain insects, including the European corn borer—a damaging insect pest of corn in the United States. Farmers use these products for the perceived benefits they offer, including increased yields, more flexibility in crop management, reduced herbicide usage, and decreased pest management costs. According to a study by the U.S. Department of Agriculture's Economic Research Service, the benefits and performance of these crops are expected to vary greatly by region, pest infestation levels, seed and technology costs, irrigation, and other factors.

Roundup Ready soybean seeds were first marketed in the United States and Argentina in 1996. The Monsanto Company, which holds U.S. patents for these seeds, licenses the Roundup Ready technology to seed companies. The licensees incorporate the technology into their conventional soybean varieties and sell the genetically modified seeds to farmers. While several seed companies market Roundup Ready soybean seeds in Argentina, Roundup Ready soybean technology is not patented there.<sup>5</sup>

Unlike Roundup Ready soybean seeds, Bt corn seeds are patented in both countries.<sup>6</sup> However, in terms of restricting the product's use, patents are not as important for corn seeds as they are for soybean seeds—hybrid corn seeds have an inherent biological protection because of how they are reproduced. Specifically, when hybrid seeds are replanted, the resulting offspring do not have the same traits as the parent plants. In contrast, succeeding generations of soybean plants are essentially identical to the parent plant. Thus, farmers do not save and replant hybrid corn seeds, whereas soybean seeds are traditionally saved and replanted in the following crop year.

Both U.S. and Argentine farmers have been in the forefront of adopting these genetically modified seeds, especially Roundup Ready soybean seeds. By 1999, 3 years after Roundup Ready soybean seeds were first marketed in the two countries, they accounted for an estimated 51 percent and 80 percent of the total soybean acreage in the United States and Argentina, respectively. Adoption rates have been lower for Bt corn, which was first marketed in the United States in 1996 and in Argentina in 1998. In 1999, U.S. and Argentine farmers planted an estimated 30 percent and 6 percent, respectively, of their corn acreage in Bt corn.

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<sup>5</sup> Both Argentina and the United States have plant variety protection laws that are a form of intellectual property protection. However, patent laws (another form of intellectual property protection) enable seed companies to obtain greater control and protection than plant variety protection laws.

<sup>6</sup> Several companies, including the Monsanto Company, Mycogen Seeds, and Novartis Seeds, hold patents for various types of Bt corn in the United States and Argentina.

## Roundup Ready Soybean Seed Prices Were Higher in the United States Than in Argentina; Bt Corn Seed Prices Were Similar in Both Countries

In 1998, the ranges of commercial prices U.S. farmers (specifically those in Illinois and Iowa) paid for popular varieties of Roundup Ready soybean seeds were higher than those paid by Argentine farmers. There were no clear differences in the price ranges of popular varieties of Bt corn seeds in the two countries. (See table 1.)

**Table 1: Price Ranges for Roundup Ready Soybean and Bt Corn Seeds in the United States (Illinois & Iowa) and Argentina, 1998**

Country	Roundup Ready soybean seeds per 50 lb. bag	Bt corn seeds per 80,000 seed bag
United States	\$20 - \$23	\$83 - \$122
Argentina	\$12 - \$15	\$75 - \$117 <sup>a</sup>

<sup>a</sup>Price ranges for Bt corn seeds in Argentina are for 1999, the first year that well-documented price data were available for this product. Reliable 1998 price data were not available because Bt corn seeds were first marketed in 1998 and accounted for less than 1 percent of Argentina's corn acreage.

Sources: Doane Marketing Research, Inc., and Argentine industry sources.

For an added perspective on these price comparisons, several issues should be taken into consideration. First, soybean and corn seed prices in the two countries are not entirely comparable for a number of reasons. For example, seed prices are from different times of the year to correspond with the different growing seasons in the United States (second quarter of the year) and Argentina (fourth quarter of the year). Second, the agronomic conditions in the United States and Argentina generally differ, as do the seed varieties used in these countries. Third, because of data limitations, we used different methodologies in constructing price ranges for the two countries. As a result, one-to-one comparisons of seeds and prices cannot be made and a precise measurement of price differences is not possible.<sup>7</sup> In addition, it should be noted that lower prices do not necessarily equate to greater profitability in crop production. While seeds are an important part of a farmer's production expenditures, other production costs, as well as the economic environment in which the farmer operates, also affect a farmer's profitability.

### Major Reasons for Price Differences

Greater control over the patented seed technology in the United States and extensive black market sales of soybean seeds in Argentina are the two primary reasons we identified for the difference in price ranges of Roundup Ready soybean seeds. With regard to greater control over patented seed technology, Monsanto's U.S. patents for Roundup Ready soybean seeds have enabled it and its licensees to restrict the availability and use of the seeds. Monsanto has applied for, but not obtained, patent rights for this product in Argentina. Patent protection in the United States has enabled

<sup>7</sup> Further details on the methodology we used in constructing price ranges can be found in our January 2000 report.

Monsanto and its licensees to require U.S. farmers to pay technology fees for each bag of seed purchased—in 1999, the technology fee was \$6.50 a bag. In addition, farmers must sign agreements restricting their use of this seed. For example, farmers may not save Roundup Ready soybean seeds for replanting. The practice of farmer-saved seeds, traditional throughout the world, is still used in the United States for conventional soybeans and other nonhybrid crops.

The second primary reason we identified for price differences was the impact of black market seeds in Argentina. Extensive black market sales of soybean seeds (primarily Roundup Ready) in Argentina—ranging from 25 to 50 percent of all soybean acreage—have depressed the prices of legally sold seeds because the black market seeds are offered at a lower price. According to Argentine government and industry officials, seed companies have lowered the prices of Roundup Ready soybean seeds to enable them to better compete for sales and market share.

As shown in table 2, the market for illegal seed sales is significantly higher in Argentina than in the United States. While farmer-saved soybean seeds are also used in Argentina in large numbers, these seeds are at least one generation old. Black market seeds, on the other hand, are sometimes the same varieties as those sold commercially and, thus, may have newer, more desirable traits than farmer-saved seeds.

**Table 2: Sources of Soybean Seeds, 1998**

Source of seeds	Estimated percentage of total soybean acreage planted	
	United States	Argentina
Commercial sales	80-85	28-50
Farmer-saved <sup>a</sup>	15-20	25-35
Black market sales	0-2	25-50

<sup>a</sup>While Monsanto's patent enables it to restrict U.S. farmers from saving and replanting Roundup Ready soybean seeds, conventional soybean seeds can be legally replanted. In Argentina, all seed saving—Roundup Ready and conventional—is legal as long as the seeds are only replanted on the farm where they were originally grown.

Source: U.S. and Argentine government and industry officials.

Argentina's seed law prohibits the sale of all uncertified seeds,<sup>8</sup> conventional and genetically modified. The certification program was designed in part to protect the intellectual property rights of plant breeders—thus, it serves as a form of plant variety protection. This protection provides a legal basis for seeking the prosecution of anyone involved in the unapproved reproduction and sale of their discoveries. A group of Argentine seed companies and breeders, called the Argentine Association for the Protection of Plant Varieties, in cooperation with the government, have attempted since 1990 to enforce the law and limit the sale of uncertified seed on the black market. This effort helped reduce black market sales from about three-quarters of all soybean seed sales in 1992 to about half in 1994. However, according to Argentine industry officials, black market sales subsequently rebounded in response to higher prices for commercial seeds following the initial marketing of Roundup Ready soybean seeds in 1996.

<sup>8</sup>Argentina's seed law requires that seed bags contain a label with unique identification and certification information. Sales of seed without this information are prohibited.

To compete with black market sales, seed companies lowered the commercial price of Roundup Ready soybean seeds from 1997 through 1999. According to an Argentine seed dealer, the commercial price reductions have led to recent decreases in sales of black market Roundup Ready soybean seeds.

In addition to these two principal reasons, other factors relating to farmers' willingness to pay for seeds and companies' marketing strategies and production costs may also contribute to price variations in seed prices in the United States and Argentina.

The amount a farmer is willing to pay for seeds depends on factors such as crop yields, commodity prices, and the costs of other agricultural inputs. For example, higher commodity prices may increase a farmer's willingness to pay more for seeds. The economic environment in which a farmer operates (including taxes, subsidies, and credit conditions) also affects how much a farmer will pay for seeds. For example, Argentina's sales tax on seeds may make Argentine farmers less willing to pay higher prices for soybean seeds.<sup>9</sup> In the United States, subsidies (for example, subsidized crop insurance and loan deficiency payments) and lower interest rates for credit may increase a farmer's willingness to pay and, thus, contribute to higher seed prices. Prices may also vary in response to seed companies' costs of producing seeds and operating in different market environments. In addition, seed firms that are closely affiliated with pesticide companies may make seed pricing and marketing decisions that complement their pesticide products. Thus, in determining the price structure for its seeds and pesticides, a company would consider the prices that competitors in the local market charge for these products.

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Mr. Chairman, that concludes our formal statement. If you or other Members of the Committee have any questions, we will be pleased to respond to them.

#### **Contact and Acknowledgment**

For future contacts regarding this testimony, please contact Robert E. Robertson on (202) 512-5138. Individuals making key contributions to this testimony and/or to the report on which it was based include Jerilynn Brezil Hoy, Dennis Richards, Kerry Dugan Hawranek, Alan R. Kasdan, Beverly Peterson, and Samantha Roberts.

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<sup>9</sup> In Argentina, farmers pay a 21-percent value-added tax on seed purchases. The farmers recover a portion of this tax when they sell the commodity at harvest—thus, their net tax burden is about 12 percent. There is no sales tax on seed purchases in Illinois and Iowa.

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